



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/602,746	06/24/2003	Brian G. McGee	02-580	9979
719	7590	09/26/2005		
CATERPILLAR INC.			EXAMINER	
100 N.E. ADAMS STREET				SOLIS, ERICK R
PATENT DEPT.			ART UNIT	PAPER NUMBER
PEORIA, IL 616296490			3747	

DATE MAILED: 09/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/602,746	MCGEE ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Erick R. Solis	3747	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 11 July 2005.
- 2a) This action is **FINAL**.                            2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-20 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) All    b) Some \* c) None of:
  1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) <input type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413)
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	Paper No(s)/Mail Date. _____
3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.	5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)
	6) <input type="checkbox"/> Other: _____.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 13,15 and 16 are rejected under 35 U.S.C. 102(e) as being anticipated by Gaessler et al (US Patent No. 6659083). Gaessler et al teach a fuel injected engine wherein the cylinders are transitioned from a first mode of operation where all x cylinders operate in that first mode, to some of the cylinders operating in the first mode and the rest in the second mode to finally all of the cylinders operating in the second mode. See the abstract, col. 3, lines 21-31 and also col. 8, lines 21-41.

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any

evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yang et al (US Patent No. 6390054) in view of Marriott et al (US Patent Application Publication No. 2003/0233996). Yang teaches transitioning between two types of engine fuel combustion modes (HCCI and SI). During transitioning some of the cylinders operate in a first mode while others are switched to the second mode. This occurs progressively so as to minimize torque shocks. Eventually all of the cylinders are switched to the second mode. See col. 4, lines 35+ and also col. 6, lines 6-17). Yang, however does not teach applying the technique of transitioning between different injection modes wherein one of the two combustion modes includes two injections (shots) per combustion cycle, nor use in a rotary type engine. Marriott et al teaches that it is known for HCCI engines to have direct fuel injection in one shot (paragraphs 6,7) Marriott et al's invention is an HCCI engine wherein the fuel is injected in two shots or more per combustion cycle (paragraphs 8,11,12 and 30) Marriott et al also teach their invention may be used in rotary type engines (paragraph 27). It would have been obvious to have incorporated Marriot et al's two shot per engine cycle HCCI combustion mode into Yang's engine since this would have provided for better timing of fuel ignition during HCCI mode. This would have resulted in an engine wherein the engine transitions from two fuel shots in HCCI mode to a well known single shot injection during SI mode.

***Response to Arguments***

6. Applicant's arguments filed 11 July 2005 have been fully considered but they are not persuasive. In particular, regarding the 35 USC 102(e) rejection of claims 13,15 and 16 as being anticipated by Gaessler et al., applicant argues that amended claim 13 first set of fuel delivery characteristics comprises a number of fuel shots and that the second set of fuel delivery characteristics is different from the first set. However, the examiner notes that there is nothing in the claim requiring that the delivery characteristics only be a number of fuel shots. It can also be fuel volume or timing. For this reason applicant's argument is not persuasive.

7. Applicant also argues regarding the 35 USC 103 rejection of claims 1-20 as being obvious over Yang (054) in view of Marriott et al that Yang does not teach fuel injection and that there is insufficient motivation for combining the two references. The examiner notes that Yang teaches the concept of gradually and progressively transitioning from one combustion mode to another in order to prevent torque shocks. It is this feature for which the Yang reference is being relied on. In light of this teaching it is the examiner's position that it would be obvious to apply Yang's technique for transitioning between any known combustion modes. Since Marriott et al teaches that applicant's claimed combustion modes (single and multiple shot) are known, it is the examiner's position that such a combination would have been obvious irrespective of Yang not teaching injection of fuel.

***Conclusion***

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erick R. Solis whose telephone number is (571) 272-4853. The examiner can normally be reached on Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Henry Yuen can be reached on (571) 272-4856. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-3700.

  
Erick R Solis  
Primary Examiner  
Art Unit 3747

ers